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C-O-N-T-E-N-T-S

The Potato As a Health Factor ..... Dr. John Harvey Kellogg

Forecasting the Potato Markets ..... H. B. Tabb

The History of Seed Potato Certification in Ohio ..... John Bushnell and E. B. Tussing

Acre Costs Versus Bushel Costs in Potato Production ..... C. M. McCrary

Crop and Market News.

Review of Recent Literature.

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The Potato As a Health Factor

DR. JOHN HARVEY KELLOGG, Battle Creek, Michigan.

Most of our great food staples, such as cereals, milk, eggs and meat, have been in use since prehistoric times: but the potato is a new-comer. The wonderful tuber was unknown in the Old World before the discovery of America. Whether or not the honor of introducing it to Europe belongs to Sir Walter Raleigh, whom King Charles executed for treason, or to Sir Francis Drake, who has a great monument to his memory in the city of Offenburg, Germany, with a border of potatoes around its pedestal, is a question that the historians seem unable to settle. That the Germans appreciate the favor that they attribute to Sir Francis, is shown by the inscription upon the monument that refers to the potato as "this precious gift of God."

It is strange, indeed, that for 300 years after the potato was first made known to civilization, there was great opposition to its use. When the potato was first exhibited in Europe, in the fifteenth century, soon after the discovery of this continent, some one started the slander that its use caused leprosy. For 200 years, this notion prevailed. When this base accusation was proved false, the poor potato was charged with being the cause of fever, a slander that prevented the use of the tuber for another hundred years.

Frederick the Great recognized the value of the potato and by various methods, including threats, endeavored to induce the German people to make use of it, but without success. It remained for an ingenious Frenchman, Parmentier, to give the potato its start in popularity.

In the year 1771, the Academy of Medicine of Besanoon, France, offered a prize for plants best adapted to supplement the foods then in use in case of famine. Parmentier offered the potato and won the prize. He also proved that the potato was innocent of the charges made against it and was a wholesome and harmless esculent. He then started a strenuous campaign for the purpose of getting the potato into general use, in which he employed such novel and efficient methods that his efforts were crowned with success. He fortunately awakened the interest of Louis XVI, who glorified the potato in the eyes of the French court and the public by wearing a potato flower in his buttonhole. The famous Queen Marie Antoinette helped the potato cause along by twining potato and orange blossoms in her beautiful hair.

One of Parmentier's schemes showed him to be a close student of human nature. He planted numerous patches of potatoes along the public highway as well as in the hundred acres that the French king gave him for his agricultural experiments. When the potatoes were grown, he placed guards over his potato patches during the day-time, but left them unguarded during the night. As he expected, the pilfering peasants distributed his potatoes and in a short time they were growing everywhere, and this unrivalled food producer was thus launched on its mission of usefulness.

About the same time, Count Rumford, a Massachusetts Yankee, was banishing beggary from Bavaria by teaching the mendicants how to raise potatoes and to make potato-soup.

The potato saved Germany from starvation during the Great War, and everywhere in Continental Europe it holds a much higher place in public esteem as a food staple than it has obtained in this country.

Scientific researches made within the last few years have shown that the potato possesses certain special food qualities that place it in a class by itself and entitles it to much higher consideration than it has heretofore received. There is, in fact, good ground for believing that if the potato were given its proper place in the national dietary, the results might be the saving of tens of thousands of lives annually.

Within the last forty years, there has been a notable increase in this country, in the mortality from diseases of the heart, blood-vessels and kidneys. Twenty-five years ago the chief cause of death in the United States was lung tuberculosis. At the present time the deaths from diseases of the heart, blood-vessels and kidneys out-number those from tuberculosis more than three to one. A late report obtained from the United States Bureau of Statistics shows that more than 319,000 per-

sons die annually from these diseases, or one-fourth of one per cent of the entire population. The three diseases named are so closely associated that they may in general be considered as really one disease, of which high blood-pressure, angina pectoris and apoplexy are common and well known manifestations. The mortality from these disorders has, in a single generation, more than doubled. The cause of this amazing increase of highly fatal diseases within so brief a period has been much discussed by medical writers, and most authorities hold that the cause is unknown. Recent studies, however, by Hindhede of Denmark, Sherman, Blatherwick, Sansum, McCollum, Newburgh and others in this country, have developed facts that seem to find a potent cause for the increase in diseases of the heart, circulation and kidneys in certain errors in diet that are generally prevalent in this country.

The late Professor Huchard, the eminent French heart specialist, some years ago, called attention to the fact that degenerative changes in the blood-vessels are due to changes in the blood. The blood is naturally alkaline. This is necessary to enable the bloom stream to keep the tissues free from the acids that form as the result of all sorts of tissue activities. The foods we eat leave in the body residues that are essentially identical with the ash produced when the same foods are burned. Some foods yield when burned, an acid ash; others, an alkaline ash. Alkali-ash foods, when eaten, increase the alkalinity of the blood, while acid-ash foods lessen it.

When the normal alkalinity of the blood is maintained, the resistance to disease is high, because the white blood cells are on the alert and are able to capture and destroy the germs of diseases that enter the blood. Endurance is great because the acids caused by work are quickly neutralized and removed. There is a sense of well-being and fitness characteristic of perfect health. The blood-pressure is at a low normal level, and the heart does its work easily and well.

On the other hand, when acids accumulate in the body, the blood alkalinity is lowered, the blood cells are less active, and so resistance to disease is lessened. There is a shortness of breath, loss of appetite, languor and a sense of unfitness. This condition is now recognized as chronic acidosis. The eating habits of the American people are well calculated to produce this condition. Meat, eggs, bread and breakfast cereals are foods that yield highly acid ash.

For years, McCollum has been calling attention to the unwholesomeness of a meat and bread diet. Such a diet loads the body up with acids and the result is seen in the vast multitude of men and women who are chronically tired. A weary expres-

sion and languid manner are habitual with scores of thousands of men and women simply because their tissues are loaded with acids.

Thousands of these tired persons seek temporary relief in the use of tea or coffee, cola drinks, cigarets, cigars, beer, wine, whisky and tonic drugs, only to find their troubles exaggerated when the transcient relief has passed.

Examination of the urine in these cases, shows a great excess of acid. Often the urine is a hundred times as acid as it should be; sometimes, according to Sansum, a thousand times too acid.

The injury done to the kidneys by constant contact with such an excess of acid manifests itself as Bright's disease in its various forms. It is reasonable to believe that in the excessive use of acid-ash foods, the American people are loading upon their hearts, blood-vessels, liver and kidneys a heavier burden than they are able to carry.

Here is a great national evil, a plague that is carrying off annually 300,000 of our finest citizens, bankers, lawyers, doctors, teachers and statesmen. Most of the victims are adults, usually past middle age, and very generally the most important members of the community. The loss the country suffers in the premature deaths of these highly useful citizens is irreparable.

In the writer's opinion, a change in the national bill of fare would do more toward correcting this prodigious evil than anything else that could be done. Less bread and cereals, less meat and eggs, and more potatoes is the simple program called for. The potato is one of the most highly alkaline of foods. It is also one of the most easily digestible of foods. Cooked potato starch digests in one-sixth of the time required for the digestion of oatmeal, and in less time than any other cereal. When well cooked, the potato is as palatable as any cereal. It supplies vitamin C, the scurvy-preventing vitamin, which is wholly lacking in all cereals and is deficient in the average American bill of fare. Howe attributes to this deficiency the almost universal premature decay of the teeth in this country. McCarrison and other authorities hold that this vitamin deficiency is a leading cause of much of the semi-invalidism found in every community.

It is not suggested that acid-ash foods must be wholly excluded from the bill of fare, although it may safely and often advantageously be done, but that they should be in part exchanged for the alkaline potato and other alkali-ash foods, the list of which includes practically all fruits, nuts, vegetables and dairy products.

The potato contains such a large percentage of potash that it will balance off half its weight of bread and two-thirds its weight of most other acid-ash foods.

If bread and cereals are reduced one-half, and eggs and meat the same, in favor of the potato and green vegetables, an almost immediate improvement in health will be usually noted.

Persons with a gouty tendency will experience almost immediate and marked relief. Various German authorities have recorded the fact that during the World War, when the potato was the leading food staple in Germany, gout practically disappeared.

McCarrison resided and practiced for several years among a native East Indian people who practically lived wholly on vegetables and dairy products, and they were entirely free from gout and, according to the observer, the finest specimens of men, speaking in relation to their physique, that he had ever seen.

The high nutritive value of the potato was shown by Hindhede in an experiment with the athlete Madsen, whose diet for 309 days consisted exclusively of potatoes and margarine. I saw this man some years later and found him an unusually fine example of robust health. He was still making the potato a large factor in his bill of fare.

A comparison of Hindhede's potato-eating experiment with a meat-eating experiment recently conducted in this country, in which the Arctic explorer, Stefansson, participated, will be found interesting. Madsen, the Danish athlete, actually ate nothing at all but potatoes with a little fat in the form of margarine during a period of nearly one year. He was doing hard muscular work all the time. He sometimes ate as much as fourteen pounds of potatoes a day. He remained for the entire time in excellent health.

Stefansson, according to the official report, was compelled to give up his exclusive meat (lean meat) diet on the second day, being made very sick by it, vomiting and purging, and did not return to it. After that he lived on fat with a little muscle meat, perhaps a pound, daily. The caloric value of the fat in his diet was four times that of the lean meat. His experiment was really a fat- or tallow-eating stunt rather than a meat-eating test. A muscle meat diet will in a few days produce such an intense acidosis as to imperil life. An exclusive potato diet, on the other hand, actually improves the health and may be continued indefinitely.

Arthur Hunter, the able actuary of the New York Life Insurance Company, in a paper on blood-pressure, called attention to the fact that the average Chinamen has a blood-pressure

several points lower than that of the average American. He accounts for the difference by the fact that he eats less meat. In the United States, meats of various sorts constitute eighteen per cent of the total food consumed, while in North China, according to Dr. Adolph of the Yenching University of Peking, China, they form less than four per cent of the bill of fare, and in South China are practically unknown.

In the United States, 17 385 persons died of kidney stones during the year 1925. If the potato had been freely used by these persons, probably the majority of them would not have suffered from stones, or would have been able to eliminate them. I recall a case in which a woman suffered greatly from a kidney stone that had lodged near the bladder. I put her on a potato diet and in three or four weeks the stone slipped away without giving pain, and the patient was cured without the surgical operation which she greatly dreaded.

At the Battle Creek Sanitarium, the potato regimen has been employed for many years, not only in cases of kidney stones but as a means of combating acidosis, and with most striking results.

The beneficial effects of a basic diet in cases of high blood-pressure have been found most gratifying. In scores of cases, a notable drop in the blood-pressure has been secured in cases that had resisted other measures. I recall one case in which the blood-pressure was reduced from 260 to 160. The patient, a man of fifty-five years who had retired from business on account of his physical incapacity, resumed active business again and seven and one-half years later was still in excellent health, with a blood-pressure of 160.

A surgeon practicing in New York City, whose family physician, a prominent New York doctor, found he had Bright's disease and gave him only six months to live, adopted the basic regimen and made such improvement that he is still, after twenty years, in robust health and working hard in his profession as an eye, ear and nose specialist.

Dr. Sansum reports a case of Bright's disease in which the blood-pressure fell from 210 to 160, with great improvement in the general health and the nearly complete disappearance of renal symptoms, as the result of the adoption of a basic diet.

The very pronounced effects of a potato diet in combating acidosis may be easily demonstrated experimentally. In a recent research on the alkalinizing effect of the potato on the blood and tissue fluids conducted at the writer's request by Dr. W. B. Lewis, of the Research Department of the Battle Creek Sanitarium, several interesting observations were made.

1. The influence of the diet upon the chemical balance of the body is so very great that changes take place very rapidly. For example, on a diet consisting chiefly of bread and eggs, both acid foods, the acidity of the urine increased so rapidly that within three days it had become twenty-five times the normal acidity.

When a subject was placed upon a potato regimen, taking from two to two and one-half pounds of potato daily and avoiding acid-ash foods, the acidity quickly disappeared, the urine becoming alkaline on the second day.

2. It was observed that an alkaline urine, the result of a potato diet, will dissolve a large amount of uric acid; whereas, the urine produced by an ordinary mixed diet, is usually already saturated with uric acid, and will dissolve no more.

When potato was added to the diet, the ability to dissolve uric acid was notably increased. This point is especially worthy of attention as it brings clearly into view the fact that when the urine is acid and the blood alkalinity correspondingly diminished, the ability to remove uric acid and other waste products from the tissues is lessened. Accumulation of these poisonous wastes in the tissues in time gives rise to functional and organic changes that manifest themselves in chronic diseases, especially leading to the development of various nervous disorders and other diseases.

On a meat diet that consisted of the ordinary bill of fare, plus ten ounces of meat, the amount of uric acid eliminated was diminished one-third, notwithstanding the fact that with the meat diet the intake of uric acid was naturally considerably increased.

It is thus evident that the substitution of potatoes for meat must exercise a strong protective influence against gout and other disorders in which there is a tendency to the retention of uric acid in the tissues.

The observation that with a meat diet the amount of uric acid eliminated is diminished nothwithstanding the fact that the intake is increased is most significant, clearly showing that a diet rich in uric acid increases the accumulation of uric acid in the tissues in two ways, first by hindering the elimination of the uric acid that is normally produced by the tissues; second, by adding the uric acid contained in the meat, which, according to Hall, is about fourteen grains to the pound of beef, and seventy grains to the pound of sweetbreads.

In view of these facts, it is not surprising that gout and allied disorders were practically unknown in Germany during the last years of the Great War, when the potato was the chief food staple.

There can be no doubt that the potato more than any other single article of food is capable of rendering a notable service in conserving and prolonging human life. It is highly important that the public should be informed respecting the supreme dietetic value of the potato and instructed in its use. Every adult should eat at least one pound of potatoes daily. It is to be remembered that the tuber is three-fourths water. Infants of six months may be given potato puree with benefit, especially as a protection against acidosis, which often manifests itself in children as cyclic vomiting.

Many persons avoid potatoes because of their fattening properties. This popular prejudice against the potato has little foundation in scientific fact. The potato like any other foodstuff is fattening when eaten in quantity more than sufficient to meet the body needs. With a restricted diet, however, the potato is no more fattening than any other food rich in starch, such as bread or other cereals in equivalent amounts.

Perhaps the most serious obstacle in the way of the increased consumption of potatoes is the great effort being made to increase the use of other foodstuffs. The millers and bakers are making earnest efforts to induce the people to eat more bread. Breakfast food manufacturers are in various ways energetically encouraging the public to eat their products. The meat packing companies are continually urging and educating the people to "eat more meat." It is impossible, of course, for any one, except a starving person, to eat more of all these foods. It is necessary to make a choice. The facts are, as I have already shown, we are already eating too much bread and cereals. We ought not to be asked to eat more just to help dispose of the surplus. Everybody knows we are eating too much meat. Doctors are every day saying to their patients, "Eat less meat," or "Cut out the beefsteak altogether." We cannot afford to "eat more meat" to save the livestock industry, as the packers urge us to do, to our personal injury through chronic acidosis and high blood-pressure and possible Bright's disease and apoplexy. More potatoes and more milk, more green vegetables, spinach, lettuce and the like, with bran and fresh fruits to aid elimination; these are the nation's greatest dietetic needs.

The city of Manchester, England, is policed by big Irishmen who were raised on a diet of buttermilk and potatoes. If the American people will eat three times as many potatoes and one-third as much meat or none at all, and will consume one quart of milk a day, the result will doubtless be the addition of two inches or more to the average height and a notable reduction in the death rate. There is no other single article of food capable of doing so much for the promotion of the health, longevity and prosperity of the American people as the potato.

Forecasting the Potato Markets

H. B. TABB, Chicago, Ill.

Forecasting future events is one of the oldest human sciences, and since our ancestors ran in packs through the forests, we have been devising ways and means of seeing around the corner of today into the tomorrow. Consciously or unconsciously, most of the decisions that make up our daily lives involve forecasting of some nature or form; and the soundness of our judgment depends largely upon the correctness of our forecast. Whether we are buying stocks, raising pigs or growing potatoes, our success lies in our ability to look into the future.

This is particularly true of a perishable commodity like potatoes, which must be sold during the marketing season of the year in which the crop is produced. Due to this perishable nature, potatoes are unusually susceptible to over-production or crop shortages, and the price fluctuations from season to season, and within a great many seasons, are very radical. During the spring of 1920, I sold potatoes at $7.75 per cwt. F. O. B. Idaho; while two years later, the top price for weeks and weeks was only 20c per cwt.

The average United States production during recent years has been approximately 390,000 bushels, of which 60% is sold each year, leaving the remaining 40% to cover shrinkage, decay, seed and the portion eaten by the farmers who produce them.

The intelligent marketing of this approximately 60% of our annual potato crop each season may easily add millions of dollars to the income of the American farmer, and in a great many instances, it spells the difference between profit and loss. All of his skill and knowledge as regards seed selection and bountiful production may easily be sacrificed by unwise marketing and production.

Forecasting the potato markets from the grower's standpoint is a broad, two-fold undertaking. The first and most important consideration is the planning of his acreage from season to season. A great many farmers use rule of thumb methods in planning this acreage, they figure out a regular rotation of crops and plant them blindly from year to year, regardless of the market prospects confronting them. I am aware that in order to maintain soil fertility, there must be crop rotation; but this does not mean that various crops cannot be substituted for potatoes when it is advisable to do so. I know of only one reason in the world why a farmer should raise potatoes commercially, and that is to make money.

If the agricultural outlook in the spring of the year indicates that potatoes will not return the cost of production plus a profit, then it is suicide to produce them. Not only does the farmer lose money himself, but he contributes to the national loss from the entire crop produced. The most vital and important time, therefore, in forecasting potato prices, is in the spring of the year before the crop is planted and before the ground is prepared.

I know that agriculture can never be reduced to an exact science so long as we are unable to accurately forecast weather and meteorological conditions; but we have what we term the law of averages. We know what the normal yield expectancy is, and until our scientists establish fundamental laws relating to weather conditions, we need to assume that normal yields will be produced. We then have at least an equal chance that the unknown weather conditions will be favorable. Anything is better than struggling along blindly from season to season like a great many farmers have been since the world began.

There is no secret formula that the potato farmer of the United States requires in order to intelligently plan his potato crop, nor does he need a course in higher mathematics to do so. The records of the Department of Agriculture are open to everyone free of charge. These records show that the average yield of potatoes at the present time in the United States is approximately 118 bushels per acre. With this figure in mind, the farmer requires only the estimated acreage in order to approximate next season's crop. This, the Department of Agriculture furnishes early in January, and again in March, in the form of "intentions to plant" reports. These reports were started seven years ago and have been remarkably accurate. Since 1923, the average variation from the actual acreage has been only 2.6%, which, in every instance, has been an underestimate rather than an over-estimate.

All the farmer now needs to complete his forecast, after the estimated acreage is multiplied by the normal yields, is a table of crops and prices during the last twenty years. If his calculations show a probable crop of 400,000,000 bushels, he can reasonably expect that the average October price in Chicago for white potatoes will be around $1.60 per cwt., as in 1927. With a crop of 450,000,000 to 460,000,000 bushels, he would anticipate that the Chicago October price would be around $1.00 to $1.10 per cwt., as in 1922 and in 1928. With a 350,000,000 crop, he would expect a Chicago October price of around $2.50 per cwt., as in 1926 and 1929. It is not difficult to estimate very closely the price level that can reasonably be expected, when we have the approximate size of the crop.

With this information in hand, each farmer must then figure out his own program, taking into consideration the adaptability of his soil to potatoes, his cost of production and his marketing facilities. Manifestly, the farmer who can produce 200, 300 or 400 bushels per acre can make money raising potatoes at a price level which would starve the farmer to death who produces only 50, 60 or 75 bushels per acre. Likewise, the farmer who is located within a few hundred miles of his logical market has a great advantage over a farmer living in a distant state, unless the latter can produce a superior potato which brings a premium price.

Production and marketing must go hand in hand, and when either outstrips the other, it spells disaster. There is scarcely any limit to the tonnage of potatoes that can be produced in the United States, and it is the adjustment of the supply each season to the practically known demand that presents our greatest national problem. Due to careful selection of seed and soil, better implements, improved methods of planting and cultivation, and better disease and insect control, the average production in the United States has increased nearly 20% during the last ten or fifteen years. The campaign for better potatoes and more of them is very much to be desired, so long as the idea is kept in mind that as yields increase,the acreage must be correspondingly decreased.

After the crop is planted, the grower's problem is one of cultivation and production until the harvest season approaches. The July, August and September reports afford everyone an excellent idea as to the actual size of the crop. During recent years, the September report has varied only about 4% from the final estimate.

The size, quality and movement of the mid-summer or intermediate crop is of considerable importance in forecasting the early fall prices of late potatoes. If Virginia cleans up at good prices during July, and New Jersey gets out of the way during August, the grower and shipper in the northern and western states can usually count upon fair prices during September and October. If, on the other hand, these intermediate states drag over into August and September, the fall markets are usually disastrous, similar to those which prevailed during the 1928 season.

When the size of the crop is known, the general rule is that whenever the production exceeds 3½ bushels per capita, the season is practically hopeless from a market standpoint. When the production ranges between 3 and 3½ bushels per capita, the market is usually on debatable ground, and the price fluctuations will depend largely on outside influences. It is only

when the per capita production is below 3 bushels that the farmer or dealer is justified, under ordinary circumstances, in taking a long pull bullish position, with the assumption that most of the chances favor higher prices during the winter and spring than in the fall of the year. In this connection, however, the fact must be kept in mind that these rules must be modified from time to time, due to the steady decrease in the per capita consumption in the United States.

After the crop is produced, the grower's problem is naturally when to sell. That is, whether he should market his crop from the fields during September and October or whether he should hold it intact for the winter and spring markets. This is a study that is worth anyone's while. During the season of 1925, Wisconsin potatoes advanced from $1.90 per cwt. in Chicago on October 1st to $4.25 on November 1st; and after declining to around $3.00 by Thanksgiving, again advanced to $5.25 per cwt. by the 10th of the following April. In 1926, prices declined from $2.60 in Chicago during October to $1.80 on March 1st, and then advanced to $5.00 by June 1st. During 1927, potatoes advanced from $1.60 in October to $2.50 on March 13th, after which they declined and closed for the season lower than at the beginning. The grower or shipper who can take advantage of even a part of the seasonal movements that come almost every year can, in many instances, more than double his net income.

There are literally dozens of price indications that the trained observer and experienced operator takes into consideration, and very few can even begin to enumerate all of the factors that they unconsciously observe and carry in mind.

The geographical allocation of supplies is always an important consideration. We divide the United States roughly into three groups—eastern, north-central and western. If either of these groups of states are materially short of potatoes, or have a material surplus, such conditions are nearly always reflected back in the markets sooner or later. This factor is particularly important when the surplus or shortage is contiguous to the densely populated areas. Unequal distribution of supplies always has a well defined tendency towards creating or bringing about strong temporary markets, during the spring months, which do not hold. This happened in 1922, again in 1927, and we have the same set of conditions with us again this season, due to the big shortage in the north-central states.

The grower who decides in the fall of the year to hold his potatoes for winter or spring markets needs to observe closely the intended planting in the early southern states that come

on the markets in competition with the tail-end of the old crop in April and May. If the southern states plant heavily, the natural inference is that old potatoes will have more than usual competition, and vice versa. The report covering this intended acreage is usually released by the Department of Agriculture early in December.

The last important factor in the way of official reports is the government estimate of stocks on hand as of January 1st, which have nearly always been an excellent barometer. Sometimes we do not believe the indications, but usually we are sorry when we do not. The average stocks of potatoes on hand January 1st is around 100,000,000 bushels. When this drops to 75,000,000 or 80,000,000 bushels, as in January 1926 and 1927, the farmer or dealer is usually justified in expecting very strong spring markets. When the holdings are normal, however, or above normal, it is usually best to dispose of potato holdings during the winter months or at least by early March, unless of course the new southern crop is short.

Trade sentiment is always an important consideration. This, however, is a dangerous forecasting weapon to use, as it is a two-edged sword which cuts both ways. In the early stage of either a bull or a bear market, the actions of the trade leaders may usually be observed with a great deal of profit; but as the movement gains momentum, it is often well for everyone to watch their step very closely. Sooner or later the market becomes over-bought, usually when everything seems the strongest, and about the saddest experience I know is overstaying a bull market.

In studying over the history of past seasons, it is surprising to note how seldom it is that the average farmer or dealer can make any money by holding for the spring markets. Storage charges, handling, sorting and shrinkage are difficult handicaps to overcome with a perishable commodity. There have been four years since 1920 when the April price was actually less than the October price, and the season of 1925 was about the only one during recent years when the farmer or dealer could shut his eyes and make a good profit. This is particularly applicable to the farmer who does not have the very best farm storage facilities.

The most common mistake in potato marketing is holding on too long, and in this connection, the action of the markets during the last fifteen or twenty years indicates very strongly that unless any given season's crop is below 360,000,000 bushels, the growers will be farther ahead year after year if they sell either from the fields during September and October or early in January.

The History of Seed Potato Certification in Ohio

JOHN BUSHNELL, Ohio Agricultural Experiment Station, Wooster, and E. B. TUSSING, Ohio State University, Columbus

In common with most of the States of the corn belt, Ohio's potato production reached a peak about 1910, then gradually declined until 1920. Fusarium wilt and virus diseases had become so prevalent that other crops were replacing the potato in most sections of the State.

During this decline, a few individuals had maintained their production, and consequently developed local seed businesses, but these were too few to supply the needs of the State. Seed potatoes were brought in from various sources, and northern seed gradually increased in popularity. The use of northern seed was stimulated and stabilized as certified seed became available.

But the fact remained that certain Ohio growers had successfully maintained good seed for a number of years, and the question naturally arose as to whether it was possible by inspection and certification to enlarge this local production to meet the requirements of the State. Consequently in 1918 the State department of Agriculture, in cooperation with a group of leading potato growers, started seed certification following the methods of the states to the north.

The first year about 11,000 bushels were certified. But many growers dropped out at once, and production was only 2,000 bushels the following season. At this time, the emphasis in the inspection was upon varietal purity and control of Fusarium wilt. Virus diseases were probably not well enough known to be adequately identified or appreciated. During the following seasons an increasing number of growers found it possible to rogue out Fusarium wilt, and production gradually increased to 11,000 in 1922.

During these first four years no special test plots were planted, and no accurate comparisons of Ohio seed with certified seed from northern states were available. In 1922 the Experiment Station began such tests. It became apparent at once that the Ohio seed which had passed certification had a much higher percentage of leaf-roll than seed from northern states. From that time on, due emphasis in inspections was placed upon leaf-roll, but it was found to be very difficult to satisfactorily diagnose in the field. The symptoms were partially masked, and frequently impossible to distinguish from the normal curling of the leaflets due to heat and drouth. Roguing was correspondingly difficult and obviously inadequate.

Those growers who were most successful had adopted the practice of planting late, and were giving special attention to their seed stock. These practices were accordingly adopted as rules, and proved to be more practical than dependence upon roguing. But secondary difficulties arose which tended to raise the cost of production. Many growers found it necessary to obtain new foundation stock. Late planting frequently resulted in poor stands, and usually gave lower yields than normal planting even when the stand was good. Considering these increased costs together with the chances of rejection, many growers turned to table stock production. The premium for certified seed was not sufficient to offset the expenses and the speculative chances. Certified seed production fell below 5,000 bushels in 1925 and has not exceeded 7,000 bushels any year since.

When it was found that special regulations were required in Ohio, and that potato certification would be something of an experiment rather than a large scale enterprise, the State Department gradually withdrew, and the responsibility was taken over by the Extension Division in close cooperation with the Experiment Station, but with the nominal responsibility vested in a grower's organization.

Various sources of certified seed which might prove of special value for foundation stock were tested at the Experiment Station. Beginning in 1927, those lots produced in Ohio which were being considered for foundation stock were also tested in the greenhouse by the Extension Division. The field tests showed that several sources of Russet Rurals from Michigan contained less than 1/10% leaf-roll. Such seed was therefore recommended for foundation stock and has proved very successful.

The system has therefore gradually developed of obtaining certified Russets from Michigan, and growing them in Ohio until virus diseases have accumulated to more than 1%. This Ohio certified seed as a whole, then, averages somewhat higher in leaf roll than the best available from the north, but at the same time it produces excellent yields, as has been reported previously.[1]

Partly because of the excellent foundation stock available, and partly because of its popularity in the State, the Russet Rural is the leading variety certified. The Smooth Rural grown is largely of a local strain, developed and maintained by Dan Egbert near Tiffin, Ohio. It is apparently a giant-hill selection of the Sir Walter Raleigh, with a growing season of

[1]Bushnell, John. A comparison of Michigan and Ohio certified seed. Amer Potato Jour. 6:6-8. 1929.

160 days when tested at the Experiment Station. It withstands unfavorable weather and the leaf-hopper better than the standard Russet Rural, and is consequently sought by small producers who are not equipped to spray. It is not widely popular because the tubers are coarse, oversize and irregular.

With regard to early varieties, very little demand for certification has yet arisen. Certification of second-crop seed has therefore not been seriously attempted, for practically none is grown in Ohio.

The general conclusion after ten years of inspection and certification of seed potatoes in Ohio is that satisfactory seed is being produced, but that its production has not proved sufficiently profitable to develop an extensive industry. As a matter of fact, the Ohio certified seed faces competition from two sources: Michigan certified seed on one hand, and home grown uncertified on the other. Michigan certified Russets have proved highly satisfactory; they are available in quantity as a standard commodity, and are highly recommended. Home grown seed one year from this certified Michigan seed has also proved to be very good, when due precautions have been observed to plant it some distance from badly diseased fields. Home grown seed is essentially the same as the Ohio certified if produced from high quality foundation stock, isolated from other potatoes, and particularly if planted late. In other words, since roguing is only a minor factor in successful production of certified seed, an unrogued field, if other conditions are the same, will produce practically as good seed as a rogued field, and without the expense of inspection and certification. The use of these uncertified home-grown Russet Rurals is justified by experimental evidence as well as wide experience. As far as late varieties are concerned, the seed requirements of the State are thus being filled by certified seed from Michigan (and to a lesser extent from other states) and from home-grown seed one-year, or even more, from certified. Hence there is no urgent need for certification in Ohio, and no indication in present trends that production of certified seed will become an important industry in the State.

Crop and Market News

Potato Prices Advance

Severe cold weather and storms in the north and west, coupled with the limited market supplies during late December and early January, helped to advance the price of potatoes to a more favorable level than prevailed in mid-December. The general rise

averaged about 25c per 100 pounds within three weeks' time. Maine showed greater strength than any other section and the state is enjoying another favorable market season, except for the period that frosted stock was being shipped.

As reported previously, southern growers of early commercial potatoes are said to be making a combined increase of about 12% in acreage this year. Florida may have 32,000 acres, compared with 22,000 last spring and 30,000 in 1928. The lower valley of Texas reports 12,250 acres, as against 9,800 in 1929, about 10,520 in 1928 and 13,460 in 1927. Combined plantings in those two areas for spring shipment are two-fifths greater than last season and 29% above their five-year average. This would be the largest combined acreage in their record. The fall crop in southern Texas, which has been moving to market, was grown on 650 acres, or 100 less than a year ago. Imported Triumphs from Bermuda were bringing $12.50 per barrel in the Cleveland market.

Plantings in the northern area are not expected to be greatly increased over those of last season. The heavier production of southern stock may make more difficult the marketing of early crops in northern and western districts.

Recent shipments from the important late-crop states have been rather limited, but movement increased sharply during the first part of January. Compared with weekly forwarding of 2,800 cars during the last half of December, about 4,800 cars moved during the opening week of the new year. Total output for that entire period exceeded the record of a year ago.

As terminal market supplies dwindled, there was a general price advance in most shipping districts, although Yakima Valley of Washington remained rather sluggish. Consuming-center prices also went up by early January. In the Chicago carlot market, sacked northern Round Whites were bringing $2.50-$2.60 per 100 pounds, Red River Ohios $2.55 and Idaho Russets about $3.25. Eastern cities quoted Maine Green Mountains and eastern Round Whites jobbing within a range of $2.75-$3.50. Shippers in western New York were getting $2.55 per 100 pounds, compared with Green Mountains in Aroostook county at $2.40-$2.45 and a North Central range of $2.25-$2.50. The western price was generally $2-$2.30 on several leading varieties. Russets in the Yakima Valley of Washington were returning mostly $41-$43 per ton of sacked stock. Compared with last season, the price situation is still very strong. What will happen with the approach of spring, no one knows. The 1930 outlook report was scheduled for release on January 27.

Review of Recent Literature

Sprague, Howard B. and Evual, E. C.—Effect of Size of Seed Piece and Rate of Planting on Yields of White Potatoes. Jour. Amer. Soc. Agron. Vol. XXI, No. 5, May 1929.

This is a summarized report of a carefully and well conducted series of experiments at the New Jersey Station in 1924, 1925 and 1926 to determine the most efficient size of potato set and distance of spacing in potato planting. Maine grown certified Green Mountain seed was used and all cutting and planting hand done, the plots being single rows about 100 feet long with several replications and border rows for discard on either side. All rows were spaced 33 inches apart, the only variables being size of seed piece and spacing distance in the row. Seed pieces were cut to ½ ounce, 1 ounce, and 1½ ounce weight. The corresponding quantity of seed per acre varied from 8.25 to 33 bushels.

Increasing size of seed piece increased the yield when spacing in the row remained the same even though as much as 33 bushels of seed per acre were required. With the same quantity of seed per acre, the highest yields were obtained from ½ ounce pieces, the lowest yield resulting from the 1½ ounce pieces.

With amount of seed per acre subtracted from total yields, the net yields increased with the rate of planting for each size of seed piece. The authors conclude that with high-priced seed and a low market value for the crop, the ½ ounce seed piece planted at the rate of 16.5 bushels per acre would have been more profitable than any other treatment. The greatest returns of crop per bushel of seed were obtained from ½ ounce seed pieces spaced 12 inches in the row. Size of seed piece and rate of planting had no appreciable effect on the percentage by weight of tubers weighing over 45 grams each.

—E. V. HARDENBURG.

Salaman, R. N.—Report of the potato synonym committee. Journ. Nat'l. Inst. Agr. Bot. 2: 170-175, 1929.

The report is based on the potatoes sent for immunity trials to the potato testing station, Ormskirk, Lancashire, in 1928. The "Synonym Committee" regard two varieties to be synonymous when all recognizable morphological and physiological characters of plant and tuber are similar. Poor soil drainage and too short a crop rotation was thought to be largely responsible for a heavy infestation of eelworm and of the corticium stage of Rhizoctonia solani. Nine groups of plants representing stocks sold as Mr. Bresee showed that in Great Britain there are several true stocks of Mr. Bresee but that in certain cases Dakota Reds have been substituted and in one case that the two varieties were mixed. Stocks sold as Border Queen were found

to be indistinguishable from Mr. Bresee and that Crimson Kidney was probably the same as Cardinal.

The committee decided that in the case of skin mutations it was inadvisable to give them new names. Thus the russet mutant of Arran Comrade should be called "Russeted Arran Comrade" rather than "Arrust Drop" as had been proposed. Several other examples are given. The committee also agreed to drop the name of Sir John Llewelyn and adopt that of Eclipse.

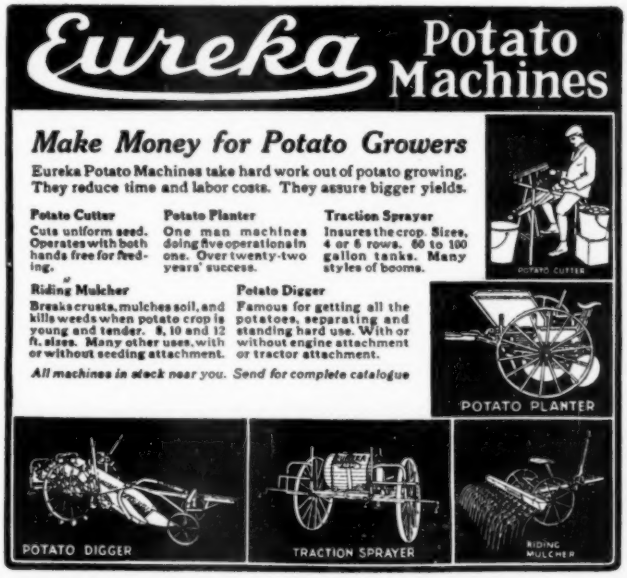
—W. STUART.

Snell. Dr. K. Potato Varieties.—P. Parey, Berlin 4th edition 1929, Price 5.60 Rm.

The above is the fourth edition of Dr. Snell's excellent booklet on potatoes, which should be read by all who deal with the variety question especially those whose duty it is to certify stocks.

The treatment of the subject is similar to that found in previous editions, but much new information has been added. Thus one finds fresh and interesting material on sprouts, leaves and flowers.

Comprehensive descriptions are given of a large number of varieties.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